

ATSF-GC

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: M67 Gun Laying and Positioning System (GLPS) White Paper

1. Over the past several months, USAFAS has received numerous inquiries concerning the use of the GLPS for orienting artillery firing units during live-fire exercises. The enclosed white paper is furnished in response to these field inquiries.
2. The M67 GLPS is approved for the use of orienting firing platoons and batteries for direction. The system, when given location from either a AN/PSN-11 Precision Lightweight GPS Receiver (PLGR) or an external source such as the Positioning and Azimuth Determining System (PADS), will provide accurate directional control for orienting the firing element. Users must be properly trained to use the GLPS in accordance with TM 9-6675-347-13&P, and the safety and training guidelines set forth in the USAFAS Tactics, Techniques and Procedures document. This TTP is formatted as a change to FM 6-50 and is available on the Gunnery Department Homepage (URL:<http://sill-www.army.mil/gunnery>)
3. USAFAS POC is SFC Howell, GLPS NETT, Gunnery Department, DSN 639-5625.

Encl

//Original Signed//  
TONEY STRICKLIN  
Major General, USA  
Commandant

DISTRIBUTION:

COMMANDER

30TH FA REGIMENT, FORT SILL, OK 73503-5601  
USAFATC, FORT SILL, OK 73503-6200  
1ST INF DIVARTY, FORT RILEY, KS 66442-5000  
1ST CAV DIVARTY, FORT HOOD, TX 76545-5103  
1-82D FA, 1ST CAV DIVARTY, FORT HOOD, TX 76545-5126  
2D ARMD DIVARTY, FORT HOOD, TX 76545-5000  
4TH INF DIVARTY, FORT HOOD, TX 76545  
10TH INF DIVARTY, FORT DRUM, NY 13602-5122  
82D ABN DIVARTY, FORT BRAGG, NC 28307-5000  
101ST AASLT DIVARTY, FORT CAMPBELL, KY 42223-5000  
210TH FA BDE, FORT LEWIS, WA 98433-5000  
IIID ARMORED CORPS ARTILLERY, FORT SILL, OK 73503-6000  
17TH FA BDE, IIID ARMORED CORPS ARTILLERY, FORT SILL, OK 73503-6010  
75TH FA BDE, IIID ARMORED CORPS ARTILLERY, FORT SILL, OK 73503-6015  
212TH FA BDE, IIID ARMORED CORPS ARTILLERY, FORT SILL, OK 73503-6009  
214TH FA BDE, IIID ARMORED CORPS ARTILLERY, FORT SILL, OK 73503-6001  
XVIII ABN CORPS ARTY, FORT BRAGG, NC 28307-5000  
18TH FA BDE (ABN), FORT BRAGG, NC 28307-5000  
(CONT)

ATSF-GC

SUBJECT: M67 Gun Laying and Positioning System (GLPS) White Paper

DISTRIBUTION: (CONT)

42D FA BDE, FORT POLK, LA 71459-5000  
V CORPS ARTILLERY, UNIT #25212, APO AE 09079-5000  
1ST ARMD DIVARTY, UNIT #23705, APO AE 09034-2137  
3D INF DIVARTY, FORT STEWART, GA 31314-5560  
41ST FA BDE, UNIT #20206, APO AE 09089-5000  
4-11TH FA, 7TH INF DIVARTY, FORT RICHARDSON, AK 98749-5000  
25TH INF DIVARTY (LT), SCHOFIELD BARRACKS, HI 96857-5000  
2D INF DIVARTY, UNIT #15564, APO AP 96257-0623  
MARINE CORPS ARTILLERY DETACHMENT, FORT SILL, OK 73503-5000  
10TH MARINE REGIMENT, CAMP LEJEUNE, NC 28542  
11TH MARINE REGIMENT, CAMP PENDLETON, CA 99205  
12TH MARINE REGIMENT, FPO SAN FRANCISCO 96602-8659  
14TH MARINE REGIMENT, NAS DALLAS, DALLAS, TX, 75211-9508  
I CORPS ARTY, 1543 SUNNYSIDE AVE, SALT LAKE CITY, UT 84105-1601  
28TH INF DIVARTY, 1720 E CARCAS AVE, HERSHEY, PA 17033-1295  
29TH INF DIVARTY, 5901 BEULAH ROAD, SANDSTON, VA 23150-6112  
34TH INF DIVARTY, 5500 85TH AVE NORTH, BROOKLYN PARK, MN 55443-1825  
35TH INF DIVARTY, 1111 N SEVERANCE, HUTCHINSON, KS 67501-5833  
38TH INF DIVARTY, 3912 W MINNESOTA ST, INDIANAPOLIS, IN 46241-4064  
40TH INF DIVARTY, 1300 FEDERAL AVE, LOS ANGELES, CA 90025-3901  
42D INF DIVARTY, 13 FIRE TOWER ROAD, REHOBOTH, MA 02769-2696  
49TH ARMD DIVARTY, 4255 IH 35 NORTH, SAN ANTONIO, TX 78218-1600  
45TH FA BDE, 600 E ELM, ENID, OK 73701-3033  
57TH FA BDE, 4108 N RICHARD ST, MILWAUKEE, WI 53212-1055  
113TH FA BDE, 110 FRANKLIN BLVD, GREENSBORO, NC 27401-4606  
115TH FA BDE, 550 BISHOP BLVD, CHEYENNE, WY 82009-3320  
135TH FA BDE, 100 W 9TH, SEDALIA, MO 65301-5704  
138TH FA BDE, 4301 AIRPORT RD, LEXINGTON, KY 40513-5138  
142D FA BDE, 3590 SOUTH SCHOOL STREET, FAYETTEVILLE, AR 72702-8026  
147TH FA BDE, 801 NATIONAL GUARD DRIVE, SIOUX FALLS, SD 57107-0288  
151ST FA BDE, 395 N PIKE WEST, PO BOX 1028, SUMTER, SC 29151-1028  
153D FA BDE, 5425 E McDOWELL STREET, PHOENIX, AZ 85008-3495  
169TH FA BDE, 55 S POTOMAC, AURORA, CO 80012-1398  
196TH FA BDE, 1801 HOLTZCLAW AVE, CHATTANOOGA, TN 37404-4806  
197TH FA BDE, 1059 CANAL STREET, MANCHESTER, NH 03101-1295  
631ST FA BDE, BOX 966, JACKSON AVE, GRENADA, MS 38902-0966  
HOW/1-278TH ACR, 1721 W LAMAR ALEXANDER, MARYVILLE, TN 37801-3764  
HOW/2-278TH ACR, 1856 RIDGE ROAD, SEVIERVILLE, TN 37862-7110  
HOW/3-278TH ACR, 1685 MCMINNVILLE HWY, SPARTA, TN 38583-7704  
428TH FA BDE, 3401 BOLAND DR, SOUTH BEND, IN 46628-4398  
479TH FA BDE, 7100 LEECH FARM RD, PITTSBURGH, PA 15206-1293  
2D BDE (FA) OSUT, 220 GOULD ST, BEAK DAM, WI 53916-1999  
1-89TH REGT, 5370 S 129TH EAST AVE, TULSA, OK 74134  
2-89TH REGT, 2734 W 10TH ST, AMARILLO, TX 79102-1102  
3-89TH REGT, 1321 VALWOOD PARKWAY, SUITE 600, CARROLLTON, TX 75006  
4-89TH FA REGT, 2515 GRAVEL ST, FORT WORTH, TX 76118-6904  
5-89TH FA REGT, 3315 9TH ST, WICHITA FALLS, TX 76309-1799  
OPERATIONS, U.S. ARMY COMBINED MANEUVER TRAINING CENTER,  
ATTN: AETHH-OG (FIRE SUPPORT SECTION), UNIT #09173, APO AE 09173  
SR FIRE SUPPORT COMBAT TRAINING, ATTN: OPERATIONS GROUP, NATIONAL  
TRAINING CENTER, FORT IRWIN, CA 92310  
OPERATIONS GROUP, U.S. ARMY JOINT READINESS TRAINING CENTER, ATTN: ATZL-JR  
(FIRE SUPPORT DIV), FORT POLK, LA 72149-5000

M67 Gun Laying and Positioning System (GLPS)  
Used for Artillery Orientation and Positioning

1. Purpose: To approve the use of the M67 Gun Laying and Positioning System (GLPS) as a method of providing directional control for units conducting live-fire operations. When discussing artillery-positioning data, three elements are included. These elements are orientation (directional control), coordinates, and height. If any of the three elements are not established accurately enough to meet accuracy specifications, the position is considered a hasty position. As a stand alone piece of equipment the GLPS cannot establish location, however, when interfaced with the PLGR or provided location data from an external source it can provide the directional control, coordinates and height to individual guns needed to live fire conventional howitzer units.

2. Discussion: This paper addresses the use of the M67 Gun Laying and Positioning System (GLPS).

a. GLPS. GLPS complements the M2A2 Aiming Circle and the PADS in conventional howitzer units, and is the primary instrument used to orient howitzers for direction while providing location data to the individual gun in the form of a grid coordinate and elevation in meters. Once the system is provided location data, the systems survey north seeking gyroscope orients itself on Grid North to an accuracy of 0.2 mils Probable Error (PE). This is equivalent to 5-order directional control the same as provided by PADS. After entering in the firing points azimuth of fire the system provides deflections to the howitzer and with the eye safe laser rangefinder and the angular measuring device it determines grid location to the howitzer to an accuracy of +/- 1 meter.

b. Artillery Directional Systems. Current FA directional systems and the GLPS with their directional accuracy capabilities and order of survey provided are shown in figure 1 below.

SYSTEM	DIRECTIONAL ACCURACY IN MILS	ORDER OF SURVEY
M67 GLPS	0.2 PE	5th Order
PADS	0.4 PE Adjusted Data	5th Order
Survey North Seeking Gyro (SNSG)	0.2 PE	5th Order
M2A2 Aiming Circle	Relies on base source + 0.5 mil loss See Note (*1)	5th Order
M2A2 Aiming Circle w/ hasty survey process	Relies on base source & +/- 2mil loss See Note (*2)	Hasty Survey
M2A2 Aiming Circle using magnetic needle	Dependent on Declination Constant & See Note (*3)	Hasty Survey

Figure 1

b. Continued:

Note 1: The M2A2 Aiming Circle using directional control provided by battalion survey (PADS or SNSG) loses 0.5 mils per measurement due to wear and age of the device.

Note 2: The directional control established by a hasty survey technique is dependant on the base source and process used, up to a +/- 2mil loss is allowable. This maintains the 5<sup>th</sup> order directional capability.

Note 3: The directional control establish by the Grid Azimuth method has too many factors involved to place an order of survey to it. (i.e., distance from declination station, magnetic attractions).

3. Closing Statement. The GLPS was developed and fielded to enhance the capabilities of the conventional firing unit, the primary reason was the age and cost of repair of the PADS. Currently the GLPS can achieve the accuracies needed for cannon artillery directional orientation as outlined in the current Standardization Agreements (STANAG) and the Artillery Position and Navigation (POS/NAV) Plan.